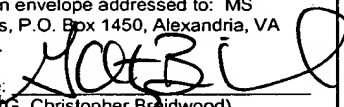


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(G. Christopher Braidwood)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yihui Deng

Application No.: 09/856,439

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For: Integrated Information Service Platform System
and Method Thereof

Confirmation No.: 8136

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Examiner: Benjamin A. Ailes

STATEMENT ACCOMPANYING SUBSTITUTE SPECIFICATION

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The accompanying Substitute Specification for U.S. Application No. 09/856,439
contains no new matter.

Dated: September 15, 2005

Respectfully submitted,

By 

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Integrated Information Service Platform System and Method thereof

Field of the Invention

[0001] The present invention relates generally to the information processing technology field, and more particularly to an integrated information service platform and a method used for electronic commerce solutions.

Background of the Invention

[0002] At present, with the development of information technology, the world is entering the information era. Electronic commerce has become increasingly a part of human life.

[0003] Electronic commerce generally consists of telecommunication services, computer network services, business services and a consumer. The traditional mode of business services should be developed. The relationship among the traditional telecommunication service provider, the business service provider and the consumer is changing.

[0004] In the electronic commerce era, telecommunication services should be effective, simple and flexible. On the one hand, accompanying the use of a lot of new technology, the basic facilities of the telecommunication services, i.e., transmission and exchange, have been greatly developed. This supports the telecommunications to provide more extensive service. The combination of computer network technology and telecommunication technology provides value-added services and implements electronic commerce. On the other hand, the business service provider and consumer have proposed more service requirements to the telecommunication service. The requirements include giving the business service provider the possibility to increase the service content and service means rapidly and easily, enabling the user to get the

needed service with any terminal. In addition, the communication facility is proceeding toward convergence. The telecommunication network, broadcast and television networks, and computer network will be converged. Based on IP technology, the information and service businesses will be united more rapidly, and will become more important.

[0005] In the electronic commerce era, business services will be specialized with electronics. The new technologies of computer networking and telecommunication networking make many traditional commercial service providers, such as department store and financial and security service institutes etc., enter the electronic commerce field. With the lack of expertise and the press of competition, the commercial service providers can only focus their attention on business development. They will outsource the electronic commerce needs to other service providers. The commercial service provider must assign and renew business according to the rapid market changes.

[0006] The consumer is the key for the success of electronic commerce. On one hand, the consumer needs to use all kinds of terminals to get the information and service for the consumer's purposes. On the other hand, the group of consumers and their requirements are changing. Outside of the traditional consumer, the business service providers provide services mutually, which forms a service chain, and the business service provider itself becomes a new consumer group.

[0007] A user is the one who enjoys the various services provided by the platform and is capable of implementing various operations with the platform. This includes individual user, resident user, government staff, company and organization etc. These kinds of user are diverse. Their computer skills are quite different and their service requirements are quite different too.

[0008] At present, on the one hand from the user's point of view, the service has a distance apart, or separation, from the electronic commerce. The user doesn't like to access the service provider's service site. The user, at same time, doesn't accept the electronic mode of service completely. Many of the services, which are closely related to the daily life, are offline. The online services now are distributed and fragmentary. Various kinds of terminals have not been used sufficiently and the access means lack compatibility. On the other hand, in order to acquire information and provide service, the service provider spends a lot of money and human resources to create and maintain the hardware and software needed.

[0009] Specifically speaking, at present there are various communication transmission networks between users and the service provider, such as PSTN, ISDN, X.25, Frame Relay, DDN, ATM, xDSL, CATV, wireless data network etc. These networks are used for accessing and transferring requirements and returning the responses.

[0010] The traditional information service mode has the following problems.

[0011] The earliest information service system is the terminal-mainframe mode. This mode is one layer of architecture. The mainframe is responsible for all of the business processing. The terminal performs only the input/output job of the operation. All of the application systems are created around the mainframe. Therefore, the portability and compatibility of the application system are lacking, and it requires special maintenance.

[0012] Later, the two layered architecture of the application system appears. This is the so-called Client/Sever mode. A complete program of the application system consists of the server program and client program, which operate on the server and client computer, respectively. In this mode, the development of the application system is customized, so each application system is mutually independent. Thus,

repeated coding and a large volume of maintenance jobs result in a waste of resources and low efficiency. An Internet browser is used to access all of the services in the network, but it does not solve the problem of creating the application system in the server.

[0013] With the above-identified mode, each service provider must have a complete set of communication facilities, create the application software himself and keep a maintenance force in routine operation. This wastes social resources. In addition, as a service provider has only limited communication facilities, when a lot of users visit a service provider, there will be obstruction and congestion.

[0014] Usually, a user needs many different services provided by different service providers. In this case, the user has to install multiple application client software systems in his computer and learn to use all of the software and interfaces. This will present the user with additional troubles.

[0015] IBM disclosed a solution to integrate the telephone switching system in a WAN or LAN as set forth in patent document EP97111728 (filed on 10th, July 1997, and entitled "Control of a telephone switching system over a digital information network"). The solution doesn't solve the problem identified above, and does not support an integrated service among multiple providers and a large volume of users with different access modes.

Summary of the Invention

[0016] With reference to the problems identified above, the invention provides an integrated information service platform and a method for united access, united management and united application. It is a total solution for electronic commerce. It is based on telecommunication and other public communication platforms. It is an intermediate layer to provide information service and exchange to service providers

and users. The platform system will support so-called 6A, i.e. Anytime, Anywhere, Any access, Any content, Any service and for Any body. This means that at any time, in any place, with any access mode, anyone can get any information and any service, i.e. ANY-TO-ANY.

[0017] The invention provides an integrated information service platform system. The platform system includes an access unit, a management unit and an application unit. These three units are connected with each other through a transmission network.

[0018] The access unit connects a user and the various service provider systems through the transmission network. It supports or enables the user to access the system with multiple modes and identification. It receives a user request proposed through the transmission network and transforms the request to a unified data format.

[0019] The management unit uses a uniform identified interface to manage and control the operation of each part of the platform system. It receives the data in a uniform format from the access unit. It authenticates user identification and authorization.

[0020] The application unit includes at least one middleware element, which is used to execute a specific processing function. The application unit selects adequate middleware to deal with a request and returns the result to the user who proposed the request.

[0021] The platform system is based on the Internet or an Intranet. The unique data format, identified above, may be the IP data protocol or other data protocol. The said above-identified management unit includes multiple management middleware elements, which are directed to addressing the basic management function, which is common to all services. The above-identified access unit includes multiple access middleware elements, which are used to process the problem related to the access

terminal. The above-identified application unit includes multiple service middleware elements, which execute the specific service processes and produce the processing result.

[0022] The invention also provides a method for the integrated information service platform. It includes several aspects that, when noted below, include the following steps:

- Access by multiple users with various access modes, by receiving requests from a user terminal through a transmission network, transforming the requests into a uniform data format, and connecting to service provider through transmission network;
- Management and control of the application and operation with an identified interface, by receiving the data with a unique format, and authenticating a user identification and authorization;
- Provision of at least one middleware element, each of which implements an application-specific processing function by selecting adequate middleware for each request proposed by the user where the middleware has passed the authentication, and returning the processing result to the user; and,
- A platform based on the Internet or an Intranet where the above-identified uniform data format may be the IP or other data protocol.

[0023] The platform system, which takes the information and service as its center, removes the limitations of time, area and access mode from the business service provider and consumer and implements 6A or ANY-TO-ANY. The platform system implements identified access, identified management and identified application.

[0024] The identified access solves the access problem of various kinds of service provider. On the one hand, the service provider doesn't like to spend too much money and effort to solve access problems. On the other hand, they hope as many users as

possible will access their system. The consumer also hopes that they have more access modes to enjoy the service provided by the service providers. In implementation, the platform system connects public and private networks, including a telecommunication network, a broadcast and television network and a computer network, through a standard interface. This enables users in different networks to communicate with each other. The terminals also can share the information services in each network. The platform system implements identical information exchange and service.

[0025] As the users are under different conditions and in different environments, different kinds of user accesses to the platform system should be in different modes. It is possible at different times the same user accesses the platform system with different modes. Even at the same time in some situations, a user may like to access the platform system with a different access mode. Therefore, it is impossible to expect that different terminal accesses to the platform system with the same network and different terminal can receive and deal with same information format. In the platform system, no matter what mode the user accesses the platform system, any user request is transformed to a unified data format after the user identification has been authenticated. The unique format data are transferred to service provider to process. The result is returned to the platform system with a unique format and is transformed into different form, which is adequate to the user terminal, which proposed the request.

[0026] The identical management solves the management problem of user and system resources. On the one hand, the user identification and authorization is authenticated once with an identified procedure and account of service is done with an identification standard. On the other hand, the system hardware equipment and software application are configured, maintained and managed in a concentrated form.

[0027] The system resource includes user, service provider, network equipment, terminal, application, etc. From the platform system viewpoint, a different user object

is only with a different attribute. In addition, the platform system uses a browser as the unique user interface. Identical management may enable the system operation automatically and easy remote maintenance.

[0028] The above-identified identical application solves the complicated and different application problem. The immense variety of service requirements renders the application development a bottleneck of the information service. The internet uses a browser to access all services, but it doesn't totally solve the application development problem. The platform system creates a mechanism to rapidly develop the application, which adapts for variety of terminals and transforms protocol and data format automatically.

The Drawings

[0029] Figure 1A is a structural diagrammatic depiction of an embodiment of an integrated information service platform system of the invention.

[0030] Figure 1B is a diagrammatic depiction of an embodiment for interconnection of multiple integrated information service platforms at the metropolitan area level.

[0031] Figure 2 is a system diagrammatic depiction of an embodiment of the integrated information service platform system of the invention.

[0032] Figure 3 is a structural diagrammatic depiction of each unit of the integrated information service platform of the invention.

[0033] Figure 4 is a diagrammatic depiction of unit logical structure of the integrated information service platform.

[0034] Figure 5 is a logical structure diagram of the integrated information service platform at a unit module level.

[0035] Figure 6 is a diagrammatic depiction of the access unit logical structure of the integrated information service platform of the invention.

[0036] Figure 7 is a dialing access diagrammatic depiction of an embodiment of the integrated information service platform of the invention.

[0037] Figure 8 is a leased line access diagrammatic depiction of an embodiment of the access unit in a computer network of the integrated information service platform of the invention.

[0038] Figure 9 is a diagrammatic depiction of an embodiment of the access unit in a broadcast and television network of the integrated information service platform of the invention.

[0039] Figure 10 is a connection diagrammatic depiction of an access unit (ACU) in accordance with one embodiment of the integrated information service platform of the invention.

[0040] Figure 11 is a logical structure diagrammatic depiction of an embodiment of a management unit of the integrated information service platform of the invention.

[0041] Figures 12A-12B show the mutual relationship between management modules and the console of an embodiment of the management unit of the integrated information service platform of the invention.

[0042] Figure 12C is a diagrammatic depiction of an exemplary software structure of the management unit.

[0043] Figure 13 is a diagrammatic depiction of the equipment connection of an embodiment of the management unit of the integrated information service platform of the invention.

[0044] Figure 14 is a logical structure diagrammatic depiction of an application unit of an embodiment of the integrated information service platform system of the invention.

[0045] Figure 15 is a diagrammatic depiction of the application unit equipment connection in an embodiment of the integrated information service platform system of the invention.

[0046] Figure 16 is a diagrammatic depiction of the application layer structure in an embodiment of the integrated information service platform system of the invention.

[0047] Figure 17 is a diagrammatic depiction of characteristics of the middleware set in an embodiment of the integrated information service platform system of the invention.

[0048] Figure 18 is a flowchart of the business service on the integrated information service platform system of the invention.

[0049] Figure 19 is a diagrammatic depiction of an embodiment on three city platforms.

[0050] In the following, the optimized embodiments of the invention are described in detail with the drawings.

Detailed Description of the Invention

[0051] Figure 1A shows a structural diagrammatic drawing of an embodiment of an integrated information service platform system 10 of the invention. It consists of three parts: Access Unit (ACU) 101, Management Unit (MAU) 102 and Application Unit (APU) 103.

[0052] The access unit (ACU) 101 implements the network access and gateway transformation. ACU is a distributed communication system. Through different transmission networks, such as a telecommunication network, a broadcast and television network and a computer network etc., it connects the business service provider and customer with the integrated information service platform. It also implements the protocol transformation of a non-data access network, such as voice/data (TCP/IP) and data (TCP/IP)/voice etc. ACU 101 is also used for interconnection between integrated information service platforms, and between integrated information service platforms and existing ISPs.

[0053] The management unit (MAU) 102 implements the management of the integrated information service platform. MAU is a distributed integrated management system. Through the integrated management structure, it manages the system resources and business resources of the integrated information service platform, such as network management, system management, customer management and accounting management etc.

[0054] The application unit (APU) 103 implements the integrated application environment of the integrated information service platform. APU is based on TCP/IP protocol. It is an open system and supports a multi-layer Client/Server architecture. It implements rapidly the business outsourcing and agent application access. Authorized by the MAU, the business service provider can use all of the access modes and terminals of the integrated information service platform to provide service to all users. The user can also select different access modes and terminals to enjoy all of the services provided by the integrated information service platform.

[0055] Figure 1B shows the diagrammatic drawing of an embodiment for interconnection of multiple integrated information service platforms 10 at the metropolitan area level. As shown in Figure 1B, the integrated information service platform 10 is an open and linearly expandable system. Its three units can be

expanded according to requirements respectively. Every unit makes cascade connection by network exchange matrix. Two or more integrated information service platforms at metropolitan area level can be connected by access unit (ACU) 101 to form an integrated information service platform with larger covering area and more services.

[0056] In each city, the integrated information service platform is established based on the existing communication infrastructure and interconnected with a communication network. With its expandability, it can cover the whole country or even beyond the border, and its service area is unlimited. It's better to take the metropolitan area as the basic service unit in the construction and operation of the platform system. Through the interconnection of the integrated information service platforms in different areas or through the interconnection between the integrated information service platform and other service networks, roaming service beyond a metropolitan area is implemented. By constructing the local service system of the integrated information service platform, the local communication infrastructure can be sufficiently used, access fees of the user can be decreased, and influence and economic benefit can be raised.

[0057] Figure 2 is the system diagrammatic depiction of an embodiment of the integrated information service platform system of the invention. As shown in Figure 2, the access unit 101 of the platform system is connected to a computer network, to a telecommunication and telephone network and to a broadcast and television network through a transmission network. Where the notebook PC and desktop PC are accessed through the computer network, the telephone and facsimile are accessed through the telecommunication and telephone network. As home PC, PDA and palm PC are accessed through a modem and the telecommunication and telephone network, telephone, home PC and TV are accessed through an STB (Set-top box) on a CATV network. On the other hand, the access unit 101 is connected with various service

provider systems to transfer data. Examples of the service provider system include a stock exchange and information service system, a real estate trading and information service system, a government organization system and other business service systems. The access unit 101 also implements the gateway transformation. It transforms all user requests into a uniform data format, which can be based on IP, such as IP data, or any other data protocol.

[0058] The management unit (MAU) 102 of the platform system uses an identical interface to manage and control resources, and it authenticates user identification and authorization. The application unit (APU) 103 provides basic service, outsourcing service and agent service. For basic service and outsourcing service, after passing the authentication of the user identification, the application unit 102 selects the adequate application middleware to process the service request, and returns the processing result to the user through access unit 101 and transmission network. For agent service, after preliminary processing, the application unit 102 transfers the user request to the adequate service provider system, and returns the processing result of the service provider system to the user. The access unit 101, management unit 102 and application unit 103 are connected with each other for data transmission.

[0059] Figure 3 is a structural diagrammatic depiction of each unit of the integrated information service platform of the invention. Each unit of every integrated information service platform consists of three modules: processing module 201, information exchange module 202 and power supply module 203. The processing module 201 is responsible for the processing job of the unit. The information exchange module 202 is responsible for communication within the unit and communication with the other two units. The power supply unit 203 is responsible for power distribution, power blackout protection and cooling in the unit.

[0060] The information exchange module 202 provides interfaces with Ethernet (10M), high-speed Ethernet (100M) and thousand of million Ethernet (1000M). At

the same time, it provides the interface capability for upgrading to 155M and 622M ATM (Asynchronous Transmit Mode). The power supply module 203 provides 220V ~ 240V, 50/60Hz a. c. power. The information module 202 and power supply module 203 are common modules for all units.

[0061] Figure 4 is a structural diagrammatic depiction of unit logical structure of the integrated information service platform. It shows the logical relationship between units. As shown in Figure 4, the ACU 101 is responsible for network communication and gateway, and it connects the business service provider and business service consumer to the integrated information service platform. MAU 102 is responsible for management of the integrated information service platform including the authentication and authorization of the user and service provider etc. APU 103 provides specific services including basic service, outsourcing service, agent service and navigation service etc.

[0062] The user proposes the service request to the integrated information service platform through the ACU 101. The MAU 102 authenticates the user. If it is the outsourcing business service of the business service provider or the basic service of the integrated information service platform, APU 103 is authorized to provide the service to the user; otherwise an adequate service provider is authorized to provide the service through the application integrated module AIM in application unit APU.

[0063] Figure 5 is a logical structure diagram of a unit module of the integrated information service platform. As shown in Figure 5, when the user accesses the ACU 101 of the integrated information service platform, at first the access network protocols of various different terminals are transformed to a unique protocol such as IP protocol; then, the service request is transferred to MAU 102 for authenticating the user identification. Secondly, the MAU 102 authorizes the user. Finally, the APU 103 provides the individual service to the user according to the user authorization

given by the MAU 102. The structure and function of each module in each unit will be discussed in detail below.

[0064] The MAU 102 collects management information from APU 103 and ACU 101. It includes access accounting, service accounting, network and system management information etc. If the accounting information is provided by a business service provider, it will be given by the business service provider.

[0065] Figure 6 is a diagrammatic drawing of the access unit logical structure of the integrated information service platform. As shown in Figure 6, the access unit includes information exchange module 202, processing module 201 and power supply module 203. The information exchange module 202 is responsible for the connection of the network equipment in the unit, and network connections with other units. The power supply module 203 is responsible for the power supply of all equipment in the unit. The processing module 201 is the kernel component of the unit. The ACU processing module is divided into two portions: communication network access processing and gateway transformation processing. Specifically, the ACU consists of the information exchange module (NSM), the terminal access module (TAM), the network access module (NAM), the leased line access module of data network (LAM), the voice/data transformation module (VDM), the facsimile/data transformation module (FDM), the data service module (DSM) and the power supply module (PSM).

[0066] As shown in Figures 5 and 6, the communication network access processing portion provides various type network interfaces to implement various communication network accesses. The communication network access processing portion of the ACU includes a terminal access module (TAM), a leased line access module of data network (LAM) and a network access module (NAM).

[0067] The TAM is used to access the personal terminals such as telephones, facsimiles and personal computers etc. The LAM is used to access the computer

network based on TCP/IP protocol or ATM protocol. The NAM is used to access the broadcast and television network using HFC. Table 1 shows the configuration of the ACU access-processing module.

Table 1 ACU access processing module

Sequence No.	Module	Access Network	Access Terminal
1	TAM	telecommunication and telephone network	computer, telephone, facsimile
2	LAM	computer network	computer, computer network
3	NAM	broadcast and television network	computer, computer network, television

[0068] The gateway transformation portion provides various heterogeneous networks transformation. The ACU gateway transformation portion includes a voice/data transformation module (VDM), a facsimile/data transformation module (FDM) and a data service module (DSM).

[0069] The VDM uses the telephone as the information terminal of the integrated information service platform. It implements the transformation between voice and network data of the integrated information service platform. It transforms the DTMF signal coming from the telephone into the command and request based on the TCP/IP, and translates the result into voice for sending back to the user.

[0070] The FDM uses the facsimile as the information terminal of the integrated information service platform. It implements the transformation between facsimile and network data of the integrated information service platform. It transforms the DTMF signal coming from facsimile and the G3/G4 facsimile command into the command and request based on TCP/IP, and translates the result into G3/G4 facsimile for sending back to the user.

[0071] The DSM uses the computer as the information terminal of the integrated information service platform. It implements the computer or computer network accesses. Table 2 shows the configuration of the gateway transformation-processing module of the ACU.

Table2 ACU gateway transformation-processing module

Sequence No.	Module	Transformation	Adequate Terminal
1	VDM	Voice/data transformation	Telephone
2	FDM	Facsimile/data transformation	Facsimile
3	DSM	Data service	Computer

[0072] Table 3 shows the module characteristics of the access unit ACU.

Table3 ACU characteristics table

Characteristics	Interface	Usage
NSM	10*100 Base-T	Connect APU, MAU
TAM	16Xe1	Access voice service, facsimile service and dial data service
NAM	E1,V35Ethernet	Access broadcast and television network
LAM	E1,V35Ethernet	Access computer network
VDM	5xE1	Voice/data transformation service
FDM	1xE1	Facsimile/data transformation service
DSM	E1,V35Ethernet 100Base-TATM	Data service
PSM	220V	ACU power supply

[0073] The access mode of ACU unit is divided into three access modes according to access user attribute. They are dialing access, computer network leased line access and broadcast and television network access. The three access processing modules process them respectively and are described as follows.

[0074] Figure 7 is a dialing access diagrammatic depiction of an embodiment of the access unit of the integrated information service platform of the invention. As shown in Figure 7, the access mode is dialing access, supporting PSTN/ISDN dialing. The

user uses the telecommunication and telephone dialing network and is processed by the TAM. According to the different user terminal, the TAM transfers to the adequate gateway automatically. If the user terminal is a telephone, then the TAM transfers to the VDM gateway. If the user terminal is a facsimile, then the TAM transfers to the FDM gateway. If the user terminal is a computer, then the TAM transfers to the DSM gateway. The access port uses E1, also supports standard access port of V5.1 and V5.2 access networks.

[0075] Figure 8 is a leased line access diagrammatic depiction of a computer network of an embodiment of the access unit of the integrated information service platform of the invention. As shown in Figure 8, the access mode is a computer network with leased line access, and the user uses a DDN/FRN/PSDN data network, which are processed by the LAM. The LAM transforms telecommunication port to terminal equipment port and connects to DSM. The access point supports the wide area port.

[0076] Figure 9 is a diagrammatic drawing of the broadcast and television network access of an embodiment of the access unit for the integrated information service platform of the invention. As shown in Figure 9, the access mode is broadcast and television network access. Except using the data network leased line, in general the user accesses directly with optical fiber. The protocols generally used are Ethernet, high speed Ethernet, FDDI and ATM etc. They are processed by the NAM. The main terminals of the broadcast and television network access are TV and computer. In general, they are accessed by the head-end of a local cable television station of the broadcast and television network. They support typical ports of wide area networks and local area networks.

[0077] The connection between the service provider system and the ACU 101 uses the above-described computer network access mode. It uses the data leased line network, which can be a virtual leased line network.

[0078] All of the connections between the ACU unit and other units are based on network protocol, mainly TCP/IP, but with the capability of using other network protocol such ATM and IPX etc.

[0079] The ACU connects with users and service providers through NAM, LAM and TAM, and connects with other units of the integrated information service platform through the information exchange module (NSM).

[0080] With the exception of connecting with internal equipment, the NSM can connect with other external units. It can also be used for ACU cascade connections in order to expand system capacity and processing capability.

[0081] With the type, the access is divided into three modes: dialing relay access, leased line access and fiber access.

[0082] The dialing relay access applies a digital circuit. Its typical interface is an E1 or V5 (V5.1 and V5.2) interface. It includes voice signals and calling signals, which are provided by the exchange of the telephone companies and are accessed to ATM. The output of ATM is provided to the VDM, FDM and DSM, and the output port is E1, and if it is necessary, the artificial seat can be accessed.

[0083] The leased line access applies wide area network leased line access. The typical interfaces are PSDN/DDN/FRN/ATM, the transmission rate is E1 or Nx64k, or even E3, OC-3 etc. The access modules used are the NAM and LAM, and their output is connected to the DSM. The main network protocol used is TCP/IP, but other protocols, such as ATM, IPX and SNA etc., are supported.

[0084] The fiber access transmits the digital information through optical fiber. The information can be multimedia information through, for example, the HFC and CATV networks, or network information, such as through, for example, an SDH fiber ring or

DDN optical fiber. It supports high speed and large capacity transmission, and the transmission rate can be over 34M (E3). It is directly connected with the high-speed port of the DSM.

[0085] The ACU may consist of one or more units. When it consists of multiple units, the cascade connection between units is through the NSM of each unit. In this way, an access group is formed. Only through the information exchange module, the connection between access group and other units of the platform can be set. In this way, the capacity of the platform system is easy to be expanded, and a large volume of users can be accessed.

[0086] Figure 10 is an equipment connection diagrammatic depiction of the access unit ACU of an embodiment of the integrated information service platform of the invention. As shown in Figure 10, the NSM is connected to the internal equipment of the ACU, at the same time it provides the network interface to be connected to the MAU and APU. There are two types of NSM: NSM2000 and NSM5000. The NSM2000 applies Cisco's Catalyst2900 Ethernet exchange, and supports 24 10M/100M exchange interfaces. The NSM5000 applies Cisco's Catalyst5000 and supports up to a hundred of 10M/100M exchange interfaces, and is capable of upgrading to an 1000M exchange interface and an ATM exchange interface (155M or 622M). It can implement an exchange of an ATM port and an Ethernet port.

[0087] The TAM is an intelligent queuing machine, where an Excel or Summa4 programmable intelligent queuing machine can be selected. There are two types of TAM: TAM2000 and TAM4000. TAM2000 selects an Excel programmable intelligent queuing machine, and it supports up to 2000 lines. TAM4000 selects a Summa4 intelligent queuing machine, and it supports up to 4000 lines and is configurable. The two types all support No.7 signaling SS7.

[0088] There are two types of VDM: VDM120 and VDM300. The VDM120 is provided in an industrial control PC, which is installed with a Pentium CPU, Window NT operating system, and 4 pieces of E1 voice card made by Dialogic Company; it supports 120 lines and China No.1 signaling. The VDM300 is a high availability voice processing system based on a SunSPARC workstation, where it can install 1-13 pieces of E1 voice card made by Dialogic Company, and supports up to 390 lines.

[0089] There are two types of FDM: FDM30 and FDM120. The FDM30 is provided in an industrial control PC, which is installed with one E1 facsimile card, and supports 30 lines of facsimile. The FDM120 can be implemented by expanding the FDM30, and be installed with 4 pieces of E1 facsimile card.

[0090] There are two types of access server of DSM: DSM120 and DSM720. The DSM120 is the ASS800 access server made by Cisco and supports up to 720 lines.

[0091] There are two types of DSM leased line access module: DSM7000 and DSM10000. The DSM7000 applies a large router Cisco 75000, and it can support a 64K-155Mbps port and can be configured according to the specific application situation. The DSM10000 applies Cisco's GSR12000 backbone router, and supports a 155M-622M port; and can be configured according to the specific application situation.

[0092] One type of NAM is the NAM3000. The NAM3000 is a DDN node exchange, Main street3600 made by Canada New Bridge Company, and accesses the port with at a speed lower than E1 speed. The port with a higher than E1 speed is directly accessed to the adequate port of the DSM with fiber. The connection port between the NAM3000 and DSM is E1 and E3. The LAM is the same as NAM.

[0093] There is only one type of PSM: PSM50000. It applies a 5KW rack UPS made by APC Company. It provides the ACU with uninterrupted, stable and pure 220V AC power.

[0094] Table 4 shows the hardware configuration of the access unit of an embodiment.

Table4 ACU hardware configuration

Equipment Name	Type	Configuration
NSM	2000	CISCO CATALYST2900
NSM	5000	CISCO CATALYST5000
TAM	2000	Excel
TAM	4000	Summa4
VDM	120	Industrial control computer + Dialogic E1 Cardx4
VDM	300	SunSPARC + Dialogic E1 Cardx13
FDM	30	Industrial control computer + Fax E1 Cardx1
FDM	120	Industrial control computer + Fax E1 Cardx4
DSM	120	CISCO AS5300
DSM	720	CISCO AS5800
DSM	7000	CISCO 7500
DSM	10000	CISCO GSR12000
NAM/LAM	3000	Main Street 3600
PSM	5000	APC 5KW UPS

[0095] All of the above-described equipment and configuration are only exemplary and cannot be considered to restrict the scope of the invention. Those skilled in the art can use other adequate equipment and configurations.

[0096] Figure 11 is a logical structure diagrammatic depiction of the management unit MAU 102 of an embodiment. As shown in Figure 11, the MAU unit includes three parts: information exchange module (NSM) 202, processing module 201 and

power supply module 203. The NSM is responsible for the connection of network equipment in the unit, and for the network connection with other units. The PSM is responsible for providing the power to all of the equipment in the unit. The processing module is the kernel of the unit.

[0097] As shown in Figures 5 and 11, the MAU includes system resource management, business resource management and a management console. Among them, the system resource manager manages all of the basic resource of the ACU, APU and MAU. This guarantees the normal operation of the whole integrated information service platform. The system resource manager includes a network management module (NMM) and a system management module (SMM). The NMM is used for network equipment management of the integrated information service platform. The SMM is used for system management of the platform, such as operating system, database, application software, software service classification, accounting scheme, service flow, new service creation, service log and start/stop etc.

[0098] The business resource manager manages the business service resources of the ACU and APU. It includes a user management module (UMM) and an accounting management module (BMM). The BMM does accounting for the business user and business service provider, respectively, for all of the chargeable service and deals with the billing.

[0099] The management console (MCC) is the general console of the MAU. It applies three layers of Client/Server application to control and manage all of the management modules. It implements a management interface with browser. The management function of the MCC can be distributed to multiple management terminals by authorization.

[0100] Figures 12A-12B show the mutual relationship between management modules and the console of the MAU of an embodiment, where the console makes

integrated control of the four above-described management modules. As shown in Figure 12B, the platform includes many databases, such as a user information database (systems directory/member database), an accounting information database (log/intermediate result/tariff), application system parameters (set/status) and system operation parameters (set/status). These databases store and process the user information, accounting information, application configuration information and configuration information of the system etc. By accessing the database, the middleware receives and provides data to the user management module (UMM), accounting management module (BMM), system management module (SMM) and network management module (NMM). Finally, it makes the monitoring through the general console MCC.

[0101] Figure 12C is a diagrammatic depiction of a software structure example of the management unit. The user database stores user data and service processing procedure and result. The user data includes user identification information, user authorization information and user account information etc. The user identification information is a pre-allocated identification for each user. When the user accesses the platform system, at first, the management unit receives the user identification from the access unit and then it authenticates this user identification with the one stored in the user database. In this way, the user identification and its authorization can be verified. The recording unit in Figure 12C is used for recording the service processing procedure and result to the database. The accounting unit is used for doing an account for the chargeable service. The authentication and authorization units can be connected to a third party authentication center, which authenticates the user identification and authorization and returns the result to the authentication unit.

[0102] Using the authentication unit mode or the third party authentication center mode to authenticate is to guarantee effectively network security and information

security. The network security technology and the information security technology themselves can use the existing technology and will not be detailed here.

[0103] Table 5 shows the characteristics of a management unit for an embodiment.

Table5 MAU characteristics

Characteristics	Interface	Usage
NSM	4x100Base-T	Connect APU, ACU
MCC	WWW	MAU general console
NMM	WWW	Network management
SMM	WWW	System management
UMM	WWW	User management
BMM	WWW	Accounting management
PSM	220V	Power supply

[0104] The network communication channel of the MAU is the NSM. With the exception of connecting with the internal equipment of the MAU, the NSM connects other external units and is used in cascade connection of the MAU to expand system capacity and processing capability. The NSM of the MAU is the same as the NSM of the ACU.

[0105] Figure 13 is a diagrammatic drawing of the equipment connection of the MAU for an embodiment. As shown in Figure 13, the MAU consists of an information exchange module (NSM), a console module (MCC), a system resource management (NMM and SMM), a business resource management (UMM and BMM) and a power supply module.

[0106] The NSM and PSM are same as the corresponding modules of the ACU.

[0107] There is one type of MCC: MCC1000. The MCC1000 consists of an industrial control Pentium PC, which applies Window NT operating system and runs the general console software or browser.

[0108] There is one type of UMM: UMM3000, and its hardware configuration is the same as the NPM3000. It processes the user authentication, authorization requirement proposed by the access unit and the application unit, and makes records and statistics of the user operation.

[0109] There are two types of BMM: BMM3000 and BMM7000, the hardware configuration of them being the same as the NPM3000 and NPM77000, respectively. They are used for accounting of users and service in real time or in fixed time, then with the accounting result they control the authorization.

[0110] There is one type of NMM: NMM3000, its hardware configuration being the same as NPM3000. It monitors and maintains the whole network, discovers the hardware and software hidden danger in time or by time, and provides operation and maintenance records.

[0111] There is one type of SMM: SMM3000, its hardware configuration being the same as NPM3000. It manages the system configuration information, user information, application flow chart information etc. for the user server, application server and network management server.

[0112] Table 6 shows an example of the MAU hardware configuration of an embodiment.

Table 6 MAU hardware configuration

Equipment name	Type	Configuration
NSM	2000	CISCO CATALYST2900
NSM	5000	CISCO CATALYST5000
MCC	1000	Industrial control computer + Windows NT
UMM	3000	Compaq Proliant 6500(rack) + Windows NT
BMM	3000	Compaq Proliant 6500(rack) + Windows NT
BMM	7000	Compaq Alpha Server 4100 + Windows NT
NMM	3000	Compaq Proliant 6500(rack) + Windows NT
SMM	3000	Compaq Proliant 6500(rack) + Windows NT
PSM	5000	APC 5KW UPS

[0113] All of the above-described equipment and configuration are only exemplary and cannot be understood to restrict the scope of the invention. Those skilled in the art can use other adequate equipment and configurations.

[0114] Figure 14 is a logical structure diagrammatic depiction of the application unit APU 103 of an embodiment. The APU unit includes three parts: the information exchange module (NSM) 202, processing module 201 and power supply module (PSM) 203. The NSM is responsible for the network equipment connection in the unit and for the network connection with other units. The PSM is responsible for the power supply of all the equipment in this unit. The processing module is the kernel of the unit.

[0115] As shown in Figure 15 and Figure 5, the processing module of the APU is divided into three parts: outsourcing application, integrated application and navigation application.

[0116] The outsourcing application part includes the basic application module (BAM) of the integrated information service platform and the application module (HAM) outsourced by the business service provider. The BAM is a set of application modules, including WWW, email, FTP, News, Chat, Facsimile, Voice Hot Line, Call Center etc. The HAM is managed and maintained by the integrated information service platform according to the outsourcing business service provider, including, for example, Web server outsource (virtual server), enterprise call center outsource and stock exchange business outsource etc.

[0117] The integrated application part is provided in an application integrated module (AIM). The AIM is a middleware suite, which provides the integrated business service to the business service provider, who does not like the outsourcing service. The AIM integrates the services of the business service providers and brings them into the platform system. The integrated information service platform provides services to authorized users and through the ACU supports the business service provider with, for example, doing accounting, settling an account etc.

[0118] The navigation application part is provided in the navigation and characterization module (NPM) of the platform. The NPM provides navigation service for all of the business resources, system resources and user helping resources of the platform, and provides an individual service interface to the user according to user habit and the information characteristics. The navigation services include voice navigation and WWW navigation.

[0119] Table7 shows the APU characteristics of an embodiment.

Table7 APU characteristics

Characteristics	Interface	Usage
Information exchange module	4x100Base-T	Connect MAU, ACU
NPM	WWW	Providing navigation and individualized service
BAM	WWW	Providing outsourcing service
HAM	WWW	Providing outsourcing service
AIM	WWW	Agent service for service provider
Power supply module	220V	Power supply

[0120] The network communication channel of the APU is the NSM. With the exception of connecting with the internal equipment of the APU, the NSM connects with other external units and makes cascade connections of the APU to expand system capacity and processing capability. The NSM of the APU is same as the NSM of the ACU.

[0121] Figure 15 is a diagrammatic depiction of the APU equipment connection for an embodiment.

[0122] The APU consists of an information exchange module NSM, a service navigation module NPM, a basic service module BAM, an outsourcing service module HAM, an application integrated module AIM and a power supply module PSM. The NSM and PSM are the same as the corresponding modules, respectively, in the ACU.

[0123] There are three types of NPM: NPM1000, NPM3000 and NPM7000. The NPM1000 is provided in an industrial control PC server, which provides voice navigation and individualized service. The NPM3000 is provided in a Compaq Proliant6500 server (rack), which provides WWW navigation and individualized service, uses the Windows NT operating system, and supports 50-100 thousand users.

The NPM7000 is provided in a Compaq AlphaServer4100 server (rack), which provides WWW navigation and individualized service, uses the Windows NT operating system and supports over 100 thousand users.

[0124] There are two types of BAM: BAM3000 and BAM7000. The hardware configuration of BAM3000 and BAM7000 is the same as NPM3000 and NPM7000, respectively. They provide the most basic service for the integrated information service platform, including WWW, email, FTP, News, Chat, Voice Hot Line and Call Center etc.

[0125] There are two types of HAM: HAM 3000 and HAM7000. The hardware configuration of HAM3000 and HAM7000 is the same as NPM3000 and NPM7000, respectively. They provide services outsourced by the business service provider, such as outsourcing Web site server computers (virtual site computers), business information announcing, enterprise call centers and stock market information announcing, etc.

[0126] There are two types of AIM: AIM3000 and AIM7000. The hardware configuration of AIM3000 and AIM7000 is the same as NPM3000 and NPM7000, respectively. They integrate with the application of the business service provider and are responsible for the authentication, authorization, recording and accounting of the user. The business service provider is responsible for the final processing of the service, such as network security trading, network call centers, network banking, network shopping and network booking etc.

[0127] Table 8 shows the hardware configuration of the APU for an embodiment.

Table8 APU hardware configuration

Equipment name	Type	Configuration
NSM	2000	CISCO CATALYST 2900
NSM	5000	CISCO CATALYST 5000
NPM	1000	Industrial control computer + Windows NT
NPM	3000	Compaq Proliant 6500 (rack) + Windows NT
NPM	7000	Compaq AlphaServer 4100 + Windows NT
BAM	3000	Compaq Proliant 6500 (rack) + Windows NT
BAM	7000	Compaq AlphaServer 4100 + Windows NT
HAM	3000	Compaq Proliant 6500 (rack) + Windows NT
HAM	7000	Compaq AlphaServer 4100 + Windows NT
AIM	3000	Compaq Proliant 6500 (rack) + Windows NT
AIM	7000	Compaq AlphaServer 4100 + Windows NT
PSM	5000	APC 5KW UPS

[0128] All of the above-described equipment and configuration are only exemplary and cannot be understood to restrict the scope of the invention. Those skilled in the art can use other adequate equipment and configurations.

[0129] Differing from the traditional two layer Client/Server application mode, the application of the integrated information service platform is a three or more layer Client/Server structure. Figure 16 is a diagrammatic depiction of the application layer structure in an embodiment of the integrated information service platform.

[0130] The client layer is provided in a user terminal. When using a computer, the Internet browser is used. For other terminals, its basic characteristic is used such as the voice and DTMF signal of a telephone etc.

[0131] The intermediate layer consists of the gateway part of the ACU, the business resource management of the MAU and the NPM of the APU.

[0132] The service layer consists of the BAM, HAM and AIM of the APU, and the related agent service of the business service provider.

[0133] Figure 17 is a diagrammatic depiction of characteristics of the middleware set for an embodiment. The management unit of the platform system includes multiple middleware, which is used to execute the basic management processing unrelated with the access terminal and specific service. The access unit includes multiple access middleware, which is used to execute the processing related to the access terminal. The application unit includes multiple service middleware, which processes a service and produces a processing result. The above-referenced middleware is a program or a module, which is reentrant and is used to produce the final user application. The middleware can be called and is responsible to solve the problems such as data portability and data security etc.

[0134] The above-described application program of the access unit, the management unit and the application unit resides in the form of middleware, and forms a middleware set, which is the intermediate layer of the three or more layer Client/Server structure.

[0135] According to the invention, the application part of the platform is a series of software suites, i.e. middleware, which implements functions of the integrated information service platform. The access middleware, together with the interface gateway of the telecommunication access network, connect various telecommunication accesses to the platform data network. The management middleware provides, on the platform data network, basic and common management service to other middleware of the platform, such as user management, authority management, accounting management and application management etc. The application middleware implements, on the platform data network, certain special function or operation, based on the access middleware and management middleware. The special function can be, for example, based on Web videotext information

announcing, video information announcing (real time or by request, broadcasting historical information), video conferencing (VC), WebChat, WebMail, WebNews, WebPaging, WebFax, bank transfer, pay on network etc.

[0136] Where the platform application unit is an application system, which implements a relatively independent and integrated business, it usually points to a field with series solutions. A specific end user can use the maintenance tool of the rapid application generation system to configure and maintain (generally, though the Web browser) them.

[0137] With this intermediate layer structure, the integrated information service platform can rapidly construct and generate the final application system, simply and directly.

[0138] The integrated information service platform has many software function modules. The Microsoft COM/DCOM distributed application architecture is used as the application specification for the whole integrated information service platform to guarantee the flexibility and expandability of the whole system.

[0139] From the application execution procedure, it can be seen that an application consists of many basic function units. Combining with these function units, a complete application flow is formed. Each function unit can complete and can only complete a specific action. Even though each unit-consists of many statements and operations, they are the smallest unit and cannot be divided again from the point of view of platform application.

[0140] Between different applications, there are a lot of basic function units that are the same, such as user authentication, user authorization, user accounting, fund inquiry, information inquiry and bank transfer etc. Only few function units are dependent on a specific application. Therefore, in the integrated information service

platform, the applications are divided into smaller function units, which forms a software set called middleware suite. An application is an orderly collection of the members of the middleware set according to the business requirement.

[0141] Therefore, the application function of the integrated information service platform is determined by the business service, the access terminal and the middleware suite. Any one of the specific applications is a combination of these three elements, so it can be described by three-dimension space, such as a magic cube, as shown in Figure 17. The application function $Mxyz = \text{business service (X)} \times \text{access terminal (Y)} \times \text{middleware (Z)}$. Each square on the magic cube represents a characteristic of the integrated information service platform. Suppose service 3 represents security service, access terminal 2 represents telephone, middleware 2 represents user authentication and middleware 3 represents fund query. Then, M322 represents a user accessing the platform by telephone and executing the user authentication of the security trading service, and M323 represents a user accessing the platform by telephone and executing the fund query of the security trading service.

[0142] The $Mxyz$ represents a cube in the drawing. When $X = 0$ and $Y = 0$, the $M00Z$ represents the middleware without relation to the specific business and terminal, in other words, the middleware with features common to all applications. When $X \neq 0$ and $Y \neq 0$, the $Mxyz$ represents the cube consisting of $M00Z + X$ business service + Y access terminal, and the Y is the access specification of the integrated information service platform.

[0143] Even though the platform application is a magic cube, which consists of the three elements, the cubes for an access mode corresponding to the access terminal of the mode have the same access characteristic, i.e. the same access specification.

[0144] The access specification is implemented at the intersection between different access terminals and a business service. It is necessary to specify the

necessary input according to the different access terminals and different applications. The input is transformed into an identical format, which can be called by the M00Z, and the result returned from M00Z is transformed to the format, which can be received by the access terminal.

[0145] For example, suppose that a user accesses the platform to make a security trade with a telephone. The following actions happen. The access middleware deals with the telephone access. The management middleware, including authentication, accounting and recording middleware, deals with the authentication, accounting and recording, which are independent of the specific service and access terminal. The security trading service middleware preliminarily deals with the security trading service and then transfers to the security service system, and returns the result to the user. All of the application programs of the modules can be formed in the middleware form.

[0146] Figure 18 is a flowchart of the business service. The ACU of the integrated information service platform accesses various kinds of terminals and unifies the protocols into one, such as TCP/IP, by the gateway in it. In this way, a user can input the information and get the result only with the terminal. Specifically, the procedure is as follows. The user inputs a request through the access unit. The UMM of the management unit authenticates the user identification and authorization for the service required by the user. If the user is authorized for this service, then the user can select and use the service in a navigation and individualized interface. The business service procedure is: identity authentication → authorization → navigation and individualization → servicing, with each operation being recorded in the log database for accounting and statistic purposes.

[0147] In an embodiment of the invention, all of the software modules are in COM form. The mutual call procedures between modules are implemented with the DCOM standard.

[0148] The Microsoft COM/DCOM specification is a mature technology. As the Windows platform occupies the market leading position, the COM/DCOM is a de facto standard. Microsoft promises that the COM/DCOM is a heterogeneous platform solution. At present, it is implemented on the Sun Solaris platform; for Digital Unix and DEC Open VMS platform, it is at the Beta version stage; for HP-UX, SGI IRIX, IBM AIX, it is in the planning stage. In addition, the third party software vendors implement COM/DCOM on the non-Windows platform for example, Software AG sells a COM/DCOM implementation Entire X, which supports the following platforms: Sun Solaris, Digital Unix (64 bits), HP-UX, AIX, Linux, OS/390 (MVS Open Edition), BS2000 and VSE etc. The Entire X for Linux is freeware.

[0149] If the integrated information service platform needs to connect with the platform without implementing the COM/DCOM specification, a bridging technology can be used. At present, except COM/DCOM, the object oriented component implementation mainly is the CORBA technology of OMG. A third party software vendor has sold a transparent bridging tool of them.

[0150] In an embodiment of the invention, all of the units of the platform use industrial standards. Every unit can be in cascade connection to expand system capacity. The console can be located inside the unit or outside the unit. When the console is set outside the unit, one should take care of the static electricity and stability of the console.

[0151] Figure 19 is a diagrammatic depiction of an embodiment with three city platforms. As shown in Figure 19, the cities A, B and C set up the integrated information service platform based on a metropolitan telecommunication network. The connection between platforms is fiber with ATM mode. When a user moves from City A to City B, he requires access to the local platform. The local platform proposes the authentication of the user's identity to the platform where the user opens

his account. The result of the authentication returns to the local platform and the user. Then, the user can get the service through the local platform. The user can also get the service from the platform where he opens his account or other platforms.

Industrial Practicability

[0152] In summary of the above description, the integrated information service platform system of the invention takes the metropolitan area as its basic service area. The platform establishes a united access, management and application platform of information service based on the communication basic platform (telecommunication or other public communication platform). The platform has integration and mechanism features. Through an outsourcing mechanism, the platform provides outsourcing service to the business service provider. Through a service agent mechanism, the platform provides rapid formal business service to the business service provider. The platform provides integrated service to the user or customer, such as security authentication, authorization, transaction, trading, office business, shopping, security trading and clearing management etc.

[0153] The integrated information service platform makes the telecommunication service deeper. The platform not only provides value-added service rapidly, but more importantly provides a high-speed business service platform as well. With the platform, the business service provider can implement or outsource the service rapidly; the user can easily use all kinds of access modes and access terminals to get information and service. In this way, the traditional telecommunication service can be value-added, the business service is more professional, cheaper and popular, and the consumer is happier and easier.

[0154] With the exception of setting up advanced large electronic commerce systems, the integrated information service platform can also be used to connect and unite various service systems. The various service systems can be, for example, a

computer service system or a voice special service system, for example the 163/169, 168/160/180/189 in China, and the new service system: ISDN service, broadband multimedia service and Cable TV data service etc.

[0155] The integrated information service platform is an electronic commerce platform for exchanging various information and service. It provides an integrated management for various kinds of users. It systematically solves the integration problems of access, management and application, which form the sectors of a chain between the business service provider and consumer. From the user's points of view, the user is not required to deal with the physical layers, such as the transmission network, exchange network and access network etc., or even the terminal and application. The user is only required to focus attention on what he really wants: information and service. From the business service provider's viewpoint, the service provider is not required to deal with system resource management, user management, accounting management, navigation management and user access etc. The business service provider can concentrate on information supply and service development. From the telecom service provider's viewpoint, through the integrated information service platform, almost all of the basic networks can be integrated by the service. This makes the telecommunication service have a new and big development space.

[0156] Described above are the preferred embodiments only. It should be understood that the scope of the invention is not limited by them. Those skilled in the art can make modifications and changes within the spirit and scope of the invention, all of which should be covered in the claims of the invention.